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RANGE CALF PRODUCTION AS AFFECTED BY GRAZING INTENSITY

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What are the relative effects of heavy and light grazing on yearlong short-grass ranges as measured by the weights of calves weaned? Does heavy grazing result in a saving in the yearlong feed cost--range plus hay--in range calf production?

An answer to these questions is now provided by six years of data from a range experiment at the U. S. Range Livestock Experiment Station near Miles City, conducted by the Forest Service since 1933 in cooperation with the Bureau of Animal Industry and the Montana Agricultural Experiment Station. The aim and conditions of this experiment remained essentially the same as reported in note No. 92 a year ago. A total of 60 high quality Hereford cows were divided into three lots of 20 each and grazed at varying intensities on adjacent yearlong range pastures with an average of 23.1 acres for heavy use, 30.5 acres for moderate use, and 38.8 acres of range for light use for each of the 20 breeding cows and their calves. Typical short-grass vegetation with a high degree of uniformity was the aim in fencing these pastures in which blue grama, bluestem wheatgrass, buffalo grass, niggerwool and little bluegrass are the five most abundant and important grasses. The breeding, care and other conditions were the same for the three lots in the experiment except that those with the smaller range acreage have required more hay on the average.

Relative Effects of Drought and of Intensity of Use on the Vegetation

The range vegetation on a series of representative quadrats and other plots in the various experimental pastures has responded more closely to weather conditions than to intensity of grazing. Extreme drought during the 1934 and 1936 seasons killed outright much of the range forage so that the total density had declined by early 1937 to approximately 10 percent of the density level in 1933 when the experiment started. More favorable moisture conditions prevailed beginning late in 1937 and through the growing season of 1938 and most of 1939. During this period the forage made a remarkable recovery but total density in early 1939 was still substantially lower for all grazing intensities than in 1933. Incomplete records for 1940 indicate that the predrought level of density in all pastures was closely approached this past spring.

Abnormal height and volume growth of the drought-thinned forage occurred during both the 1938 and 1939 seasons which bolstered total forage production of drought-thinned forage so that cow months feed furnished by the various experimental pastures in 1939 was approximately 90 percent of the 1933 figures. It is evident that the after effects of the drought would have been far more severe except for this abnormal height and volume growth during the early stages of density recovery.

It might be expected that the forage on heavily grazed pastures would in six years show clear cut and significant density differences in comparison with more conservatively grazed pastures. Certain minor differences in the behavior of the vegetation grazed at varying intensities were noted which may indicate that the heavily grazed forage is being slowly weakened, but these had not in 1939 become significant or clearly due to grazing intensity. All major and significant changes in vegetation have been quite uniform for the forage grazed at the various intensities and are clearly due to extreme drought followed by more favorable weather on all pastures alike.

Calf Weights and Feed Costs as Affected by Grazing Intensity

A range livestock producer is vitally concerned with yearly costs and returns from a breeding herd as well as with the permanent welfare of his range forage. His constant problem is to balance the range and supplemental feed requirements so that he will have the greatest net returns from production currently and in the long run. In this experiment, calf weights at weaning time have for six years been consistently and markedly lighter from heavily grazed range than from adjacent moderately or lightly grazed range. Also, due to the greater yearly hay needs for the breeding herd, the total feed costs have been greater. The net result is a substantial penalty from heavy grazing which will doubtless be still heavier when the forage production on these pastures falls below the others.

The extent of this penalty due to heavy grazing may be judged from data that have been summarized on the attached chart and in the following discussion. During the 6-year period, the 20 cows in each lot have produced 91, 102, and 99 weaned calves weighing in the aggregate 27,020, 33,796 and 32,840 pounds, respectively, from heavily, moderately and lightly grazed pastures. It will be noted that the weaning weights for the moderately and lightly grazed ranges have averaged practically the same. The average weight of 296.9 pounds for those on heavily grazed range has been approximately 35 pounds less than these. The greatest average difference was 72 pounds in favor of the lightly grazed lot during the 1934 drought year, but those on heavily grazed ranges have each year averaged lightest of the three lots.

The full import of these differences in production for each lot of 20 cows is realized only when total weaning weights are prorated to all cows--both wet and dry--in each lot. When this is done, the averages are 225.2, 281.6, and 273.7 pounds, respectively. The average production per cow on heavily grazed range is thus 56.4 pounds below that for cows on moderately and 48.5 pounds less than those on lightly grazed ranges. At 8 cents per pound, these differences amount to $4.51 and $3.88 greater yearly return per cow for those on moderately and lightly grazed ranges before making any allowance for greater feed costs and lower market value of the less thrifty calves produced on overgrazed range.

Total feed costs for the cattle on heavily grazed pastures have been actually higher than for the other lots because the former have required a greater amount of relatively more expensive hay. Alfalfa hay has been the chief supplemental feed used, but a small amount of dried beet pulp was fed one winter. At $8 per ton for hay, $16.70 per ton for dried beet pulp and 10 cents per acre yearly for the range forage, the total feed cost during the six years for 20 cows of each lot is as follows:

Heavily grazed lot	$1,261.93
Moderately grazed lot	1,132.99
Lightly grazed lot	1,182.19

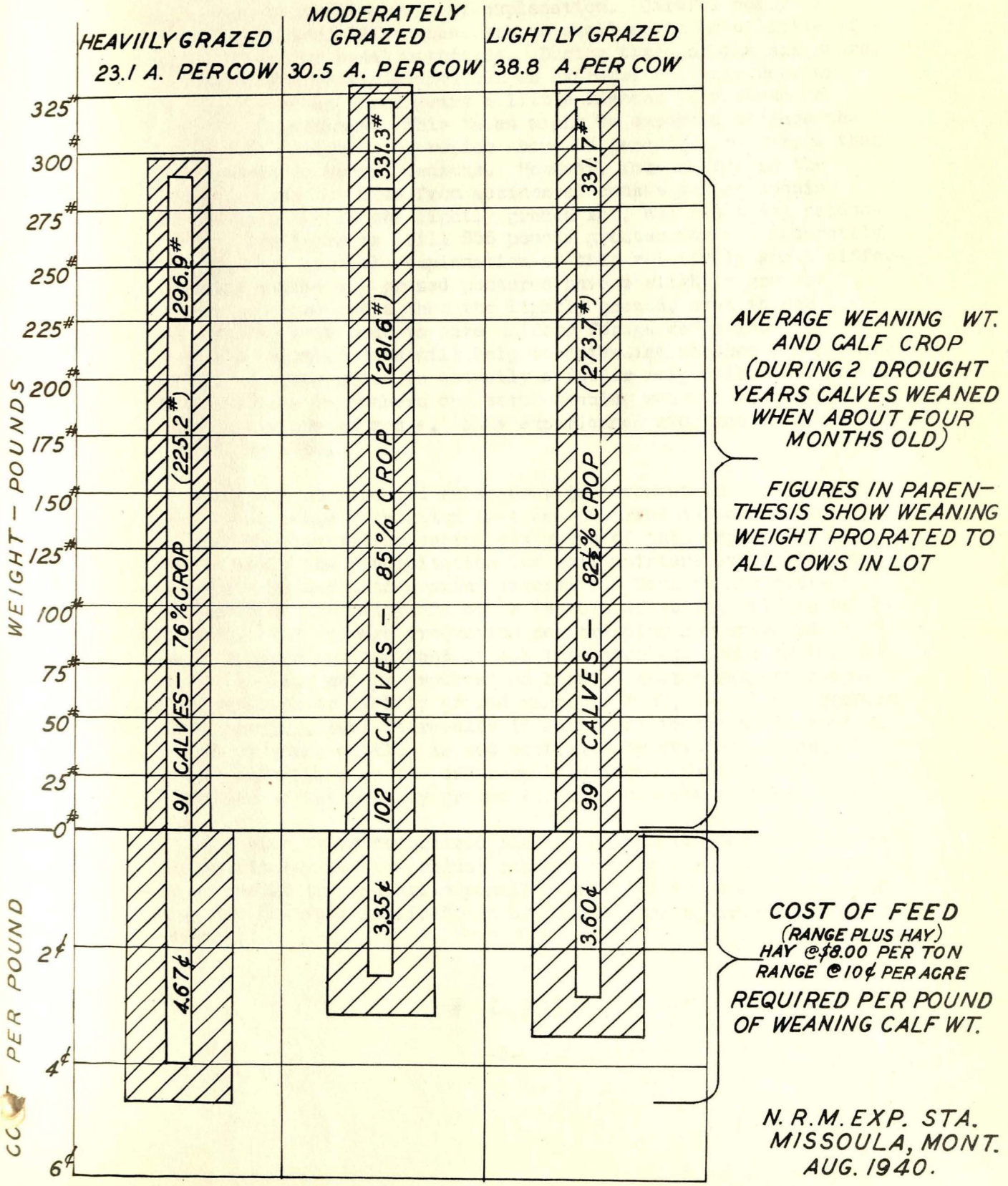
The supplemental feed costs are 78, 68 and 61 percent, respectively, and range costs 22, 32 and 39 percent, respectively, of the above totals.

Notice on the lower section of the attached chart, the comparative feed costs when total weaning weights from the various lots are divided by the total feed costs. The average of 4.67 cents per pound for those on heavily grazed range is approximately 30 percent greater than either of the other two lots. If the lower market value of calves and the higher rate of depreciation on the mother cows were included in this comparison, this 30 percent penalty for heavy grazing would be even greater.

WEANING WEIGHTS & FEED COSTS

AVERAGE WT. CALVES – 6 YEARS

INTENSITY OF RANGE USE



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The fact that average production per cow has been slightly higher on moderately grazed as compared to lightly grazed pastures where a 6-year total of 102 and 99 weaning calves were produced, respectively, deserves a word of explanation. Careful analysis indicated that these differences are so small as to have little if any significance by usual standards. During three of the six years, the calves on moderately grazed ranges averaged a little heavier and during the other three years a little lighter than those on lightly grazed pastures. This is as might be expected because the experiment was designed to provide about 25 percent more forage than would be needed in normal seasons. However, four calves in the moderately grazed lot died from accidental causes before weaning as against only two in the lightly grazed lot, but the total production during six years is still 956 pounds greater for the moderately grazed lot. One possible explanation of this relatively small difference is that moderately grazed pastures have a slightly greater proportion of grama grass than the lightly grazed, even though special efforts were made to have uniform forage conditions for all intensities. Further data will help to determine whether the greater proportion of grama grass is actually a factor responsible for the slight difference in numbers and total weaning weights of calves from moderately grazed range. Many experienced stockmen believe this to be the case.

The great decline and subsequent improvement in the density of short-grass range vegetation that has occurred quite uniformly at all grazing intensities during six years of this experiment have followed closely the precipitation and soil moisture available for forage growth rather than grazing intensity. Drought has overshadowed grazing intensity and other factors affecting welfare of the forage crop. The average production per breeding cow averaged about 50 pounds lighter and the cost of all feed averaged about 30 percent higher for weaning weight produced on heavily grazed ranges as compared to moderate or lightly grazed ranges. Thus, the chief argument for heavy grazing, that it results in an immediate saving in cost of production of range cattle, is not confirmed by this experiment. Production costs have on the contrary been increased even before deterioration of the heavily grazed range is clearly evident.

Only when it is recognized that a continuation of heavy grazing has inevitably led to gradual range deterioration and is most likely to result in cumulative penalties of higher costs and reduced returns, are the full implications of such a grazing practice fully appreciated.

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